

Update on Tritium Investigation – June 2006

What is tritium?

Tritium is a radioactive form of hydrogen. Chemically, tritium behaves like hydrogen and can be found in water molecules in place of hydrogen. For example, a water molecule may exchange one of its hydrogen atoms for a tritium atom, resulting in “tritiated water.” Like regular water, tritiated water is colorless and odorless. The chemical symbol for tritium is H-3. It is a hydrogen atom with two neutrons and one proton in the nucleus. The half-life of tritium is 12.3 years. Tritium emits a very weak beta particle. The stable end product of tritium is helium-3, which is not radioactive.

Where does tritium come from?

Tritium comes from both natural and man-made sources. Tritium is produced naturally by cosmic rays passing through the atmosphere. Significant amounts of tritium were also produced by the atmospheric testing of nuclear weapons. Tritium is also produced in nuclear facilities and high-energy accelerators. Several nuclear test reactors at Santa Susana have been identified as potential sources of tritium.

What are the results of tritium analyses in groundwater?

The analysis for tritium is part of the ongoing groundwater monitoring program at SSFL. More than 1,000 groundwater samples from 140 locations including both on and off-site wells and springs have been analyzed for tritium. Only 4 wells, all on-site, have shown levels above the drinking water standard of 20,000 pCi/l. Five other on-site wells have shown levels above 1,000 pCi/l. The tritium has been detected in groundwater that is not used for drinking water purposes.

What else is in the wells?

The groundwater was also analyzed for chemical impacts and other radionuclides. At some locations concentrations of organic compounds, typically trichloroethylene (TCE), a degreaser historically used at Santa Susana, are present. Tests for radionuclides, in addition to tritium, have detected naturally occurring uranium and thorium isotopes and their decay products.

Could I be exposed to the tritium from Area IV?

No. Tritium exposure is most likely to occur when people drink water contaminated with tritium or shower in tritiated water. The groundwater on the site is not used as a source of drinking water or household water supply, nor will it be in the future.

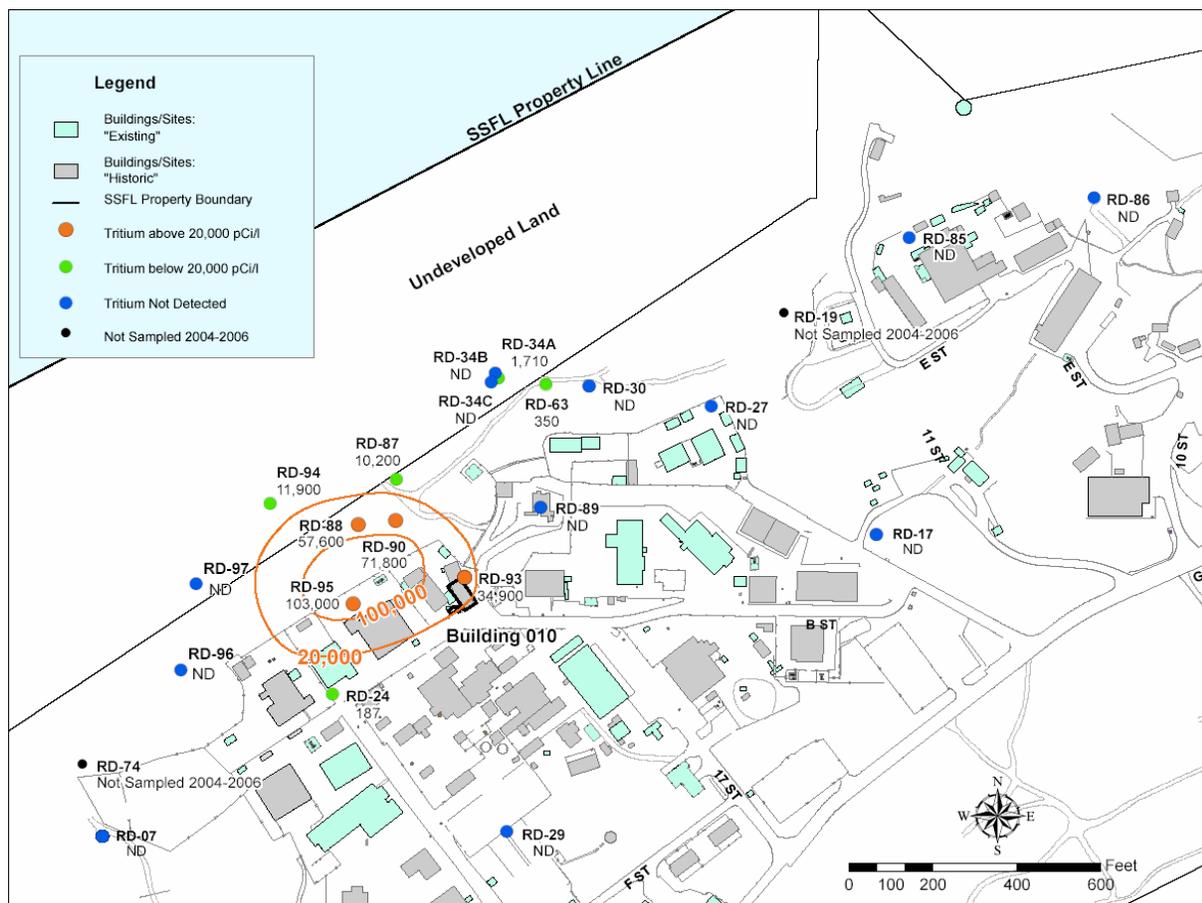
What are you doing to define the extent of tritium contamination in groundwater?

During the last two years, Boeing and DOE have constructed 11 additional wells to further characterize the type and extent of radiological impacts on groundwater in Area IV (see map below). Three facilities do not appear to be significant sources of tritium: the Sodium Reactor Experiment, Building 4059 and Building 4028. The Building 4010 area continues to be the focus of the tritium investigation.

What are the new findings?

Tritium was not detected above the laboratory detection limit (approximately 200 pCi/L) in the first set of groundwater samples collected from wells RD-96 and RD-97. The initial result of tritium analyses in water samples collected from wells RD-96 and RD-97 indicate that shallow groundwater northwest of Building 4059 has not been impacted. Results of the groundwater investigation in Area IV suggest Building 4010 was the most likely source of tritium.

Tritium Groundwater Sampling in Area IV



Has tritium migrated off-site?

No. Tritium in shallow groundwater has migrated only several hundred feet from the likely source area. The vast majority of on-site groundwater wells, seeps, springs and soil that have been sampled are non-detect for tritium. No tritium has been detected in any off-site wells.

What are you going to do next?

The results of this latest round of sampling show that the approximate limits of tritium impacts to shallow groundwater have been identified. We will continue to work with the regulatory agencies to investigate the nature and extent of tritium impacts to groundwater. Additionally, we will evaluate remedial action alternatives and continue to monitor existing groundwater wells. We will update the community as those results become available.

How can I get more information?

For more information, please contact Mike Lopez at the DOE office in Oakland (510) 637-1633 or Dr. Ravneesh Amar at the Boeing office at SSFL (818) 466-8782.